REMARKS:

Claims 1-16 are in the case and presented for consideration.

In a response dated January 15, 2004, applicant amended the title of the invention to better indicate the nature of the invention. In particular, the cooperative nature of the agents is important to the operation of the system and method to produce results in a time-efficient manner. The title was objected to because of the addition of the term "cooperative," which the Office believes to be new matter.

Applicant respectfully disagrees with the Office for the following reasons. In the Field and Background Of The Invention section (paragraph 2), the specification introduces that this invention relates generally to the field of distributed decision problem solving. In paragraph 19, the specification expands that distributed problem solving is a problem solving method in which a _cooperative_ solution to a problem is generated by loosely coupled agents. Thus, applicant expressly disclosed the cooperative nature of the claimed invention.

Cooperative algorithms were described in the specification in the set of six unique coordination schemes described in paragraphs 59 through 67. In these local, joint, pool, elite local, elite joint, and elite pool, the next solution/iterate is selected by the process of a mutual cooperation among the nodes. In each of these coordination schemes there is a set of solutions $\{x\_g'\}$ that is produced by splicing the decisions from each of the nodes. One skilled in the art would understand that this splicing is impossible without the cooperation among computational entities in the nodes.

The examiner has also argued in the Office Action that although the specification indicates that coevolutionary agents are spread among several nodes (see paragraph 49), nodes, as defined by the applicant, do not produce a cooperative search. Applicant

respectfully disagrees with the examiner's interpretation of the phrase. The constituents

of a node have been described with great deal in the specification. One skilled in the art

would understand from the specification, as a whole, that the words "search by nodes"

were used as a shorthand for the underlying algorithm operations. For example, paragraph

34 and 35 in the Summary of the Invention section of the specification describe the sole

objects of the invention as follows:

> It is an object of the present invention to provide a new method
> and architecture for solving complex problems using a class of efficient
> and scalable algorithms in a distributed network environment.

> It is a further object of the invention to provide a method and
> system for solving problems using <u>coevolutionary algorithms in a
> distributed network having multiple nodes</u> in which a solution to a given
> problem can be obtained from any node in the system. (Emphasis
> Added)

Paragraph 45 states that multiple coevolutionary agents 30a-30d are spread among

nodes 20a-20d. Paragraph 52 states, "The coevolutionary algorithms <u>embodied</u> in

coevolutionary agents 30a-30d have no direct means..." (Emphasis added). Thus, one

skilled in the art would understand from the specification that algorithms are used in a

network having nodes. The cooperative search referred to in paragraph 49 is clearly

accomplished by coevolutionary algorithms embodied in coevolutionary agents spread

among a distributed network of nodes 20a-20d. The Office's interpretation of the phrase

"search by nodes" is inconsistent with the description of nodes and cooperative algorithms

as described consistently elsewhere in the specification. In light of the confusion however,

applicant has amended the specification to clarify the intended meaning of the phrase. No

new matter has been added.

Furthermore, applicant defined "Coevolutionary algorithms" in paragraph 13,

indicating that "Coevolutionary algorithms are distributed and consist of distinct distributed algorithm components that considered together follow various models of cooperation or competition. Based on the arguments made above, it is clear that applicant intended to disclose a model of cooperation.

Claims 1-16 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The Office states that applicant is silent on "cooperative coevolutionary agents," with the exception of paragraph 49. Again, applicant respectfully disagrees.

As explained above, not only is it clearly stated that the invention is related to distributed decision problem solving, which is a method in which a cooperative solution is generated by agents, but the specification also gives extensive examples which one skilled in the art would understand to embody cooperative coevolutionary agents. A cooperative search is discussed in paragraph 49, which is clearly accomplished by coevolutionary algorithms embodied in coevolutionary agents (30a-30d) spread among a distributed network of nodes (20a-20d). Furthermore, applicant gives an extensive and detailed explanation of how cooperative coevolutionary agents are programmed with algorithms and swap information between nodes according to one of six schemes described in paragraphs 59 through 67. Thus, applicant believes that the examples and descriptions given in the specification, especially in light of applicant's reference to prior art theories of cooperative solutions based on the teachings of Potter and Lesser (see paragraphs 16 and 22-23), reasonably convey to one skilled in the art possession of the claimed invention as it pertains to cooperative coevolutionary agents.

Claims 1-16 were rejected pursuant to 35 U.S.C. §102 as anticipated by the disclosure contained in an IEEE Proceedings article naming F. Seredynski as the author

("Seredynski").

Claims 1 and 5 were previously amended to explicitly recite that the co-evolutionary agents are cooperative co-evolutionary agents, in order to distinguish them from competitive agents.

Also, new claims 9-16 were presented to seek protection for a system embodying the method now recited in claims 1-8.

Applicants respectfully traverse the rejection of claims 1-16 and submit that all of claims 1-16 are patentable over the Seredynski reference, as well as the other references of record in this case. Applicants respectfully submit that there are significant differences between the invention as claimed and the Seredynski reference, as explained in applicant's previous response of January 15, 2004.

The examiner has responded to those significant differences by arguing that the concept of cooperative agents is new matter and applicant's invention is anticipated. As explained above, the concept of cooperative agents is not new matter and thus, applicant's invention is not anticipated for the reasons stated in applicant's previous response.

Applicants reiterate that the method and system of Seredynski utilizes a **competitive** coevolutionary algorithm (see p. 432, col. 2, lines 16-21), rather than a **cooperative** co-evolutionary algorithm as recited in claims 1, 5, 9, and 13 of applicant's invention. Seredynski notes that others have proposed cooperative approaches, but he discards cooperative approaches as unacceptable compared to the competitive approach described in the article. See p. 432, col. 2, text following heading B. The examiner has responded that the specification is silent as to cooperative coevolutionary agents and that there was no intention to implement such agents. As explained above, the specification is not silent as to cooperative coevolutionary agents, and there is a clear intent to

implement such agents.

Applicants further reiterate that in claims 4, 8, 11, 12, 15 and 16, specific schemes for coordinating the actions of the mobile agents are recited. None of these schemes are disclosed in Seredynski; the section of Seredynski that the Office has referenced (pg. 432, col. 2, lines 3-10) does not mention any one of these schemes. The Office has only responded that "Seredynski anticipates the applicant's invention." The Office has not responded to applicants' assertions that the claimed schemes are not disclosed. Applicant invites the Office to point out with specificity (not just by page, column, and lines) the schemes that the Office believes anticipate the claimed schemes.
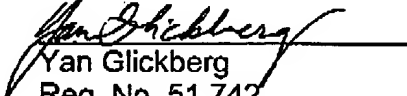
Finally, applicant submits that Seredynski fails to teach or suggest the recited limitation in claims 1, 5 , 9 and 13 of conducting concurrent local searches for producing local solutions using information available from the corresponding one of the local databases. Use of information from local databases is not disclosed at any of the sections which the examiner has cited. Again, applicant invites the Office to point out with specificity (not just by page, column, and lines) the local solutions produced and the local databases used in Seredynski.

Accordingly, the application and claims are believed to be in condition for allowance, and favorable action is respectfully requested. No new matter has been added.

If any issues remain which may be resolved by telephonic communication, the Examiner is respectfully invited to contact the undersigned at the number below, if such will advance the application to allowance.

Favorable action is respectfully requested.

Respectfully submitted,

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